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SECTION

Management

UTAH STATE WATER PLAN - WEBER RIVER BASIN PLAN

The wise and prudent management of water resources impacts nearly all aspects of growth and development within an entire drainage basin and/or region. Water influences the quality of life, the overall environment and, to a large degree, economic growth.

6.1 Introduction

This section of the Weber River Basin Plan presents information and data relating to the management of water resources and all related facilities to store, treat and distribute water to various end users. Discussions also outline the role of various water provider organizations and their individual responsibilities to provide a clean and reliable source of water to residential, commercial, industrial and agricultural demands within the basin.

6.2 Setting

The development of water resources requires a high degree of planning, commitment and cooperation between public and private entities. The construction and operation of dams and reservoirs, treatment plants and distribution facilities, including the commitment of labor and equipment, is a complex undertaking that must be managed effectively.

The Weber River Basin is one of the most developed hydrologic basins in Utah in terms of water storage, treatment and distribution. The basin has a total watershed area of over 1.5 million acres that yields an estimated 979,400 acre-feet of surface and groundwater annually.

The completion of several large water reclamation projects within the basin has resulted in the construction of eight major dams on the Weber and Ogden River systems. The combined storage capacity of these reservoirs totals 525,900 acre-feet or 54 percent of the average annual basin water yield. Other service facilities include six culinary water treatment plants and related distribution systems, hundreds of miles of irrigation canals and laterals servicing basin

farms and ranches, and over 65 smaller reservoirs providing flood control, recreation and/or irrigation water to basin water users.

6.3 Management Entities and Systems

Water resources and related service facilities are managed by a variety of agencies and organizations. Annual water use summaries published by the Division of Water Rights indicate that 16 different types of water provider agencies exist in the basin. These agencies include small ditch and canal companies, larger water conservation and conservancy districts, and a number of public works departments associated with various larger municipalities.

Water provider organizations can generally be categorized based on their general legal designation, clientele base and type of service provided. However, a given category can provide different types of water service to several different types of clientele. As an example, there are 108 water provider organizations classified as irrigation companies. A relatively large percentage of these companies, however, provide water for irrigated agriculture and municipal secondary uses. In addition, large water conservancy districts, such as the Weber Basin Water Conservancy District, provide culinary, municipal, secondary and agricultural irrigation water direct to individual users and a number of other smaller provider organizations. Various data and information on file with the division of Water Rights have been evaluated for each type of water provider agency. The results are presented in Table 6-1 for 330 water provider organizations.

6.3.1 Agricultural

Agriculture water providers include conservation and conservancy districts, irrigation, ditch, canal and, in some cases, reservoir companies. They are generally small entities governed by boards of directors employing a part-time general manager with relatively small clerical and facility maintenance staffs. These organizations are generally financed through assessments on water shares owned by individuals.

Although farms and ranches are the largest users of agricultural water, a number of water provider agencies have converted substantial portions of existing irrigation water conveyance systems to accommodate secondary residential water demands. Individual secondary systems service from 100 to 1,000 acres of residential developments primarily in Weber, Davis and Morgan counties.

6.3.2 Municipal and Industrial

Municipal and industrial (M&I) water providers generally include water or public works departments of

generally used to irrigated ornamental grass and landscaping.

The basin has 34 incorporated towns and cities. And not all of these municipalities have public works departments that operate and maintain their own culinary and secondary water distribution systems. Some of the municipalities that manage their own systems include Ogden, Layton, Clearfield, Roy, Bountiful, Park City, South Ogden, Riverdale, Kaysville, Farmington, Centerville and North Ogden.

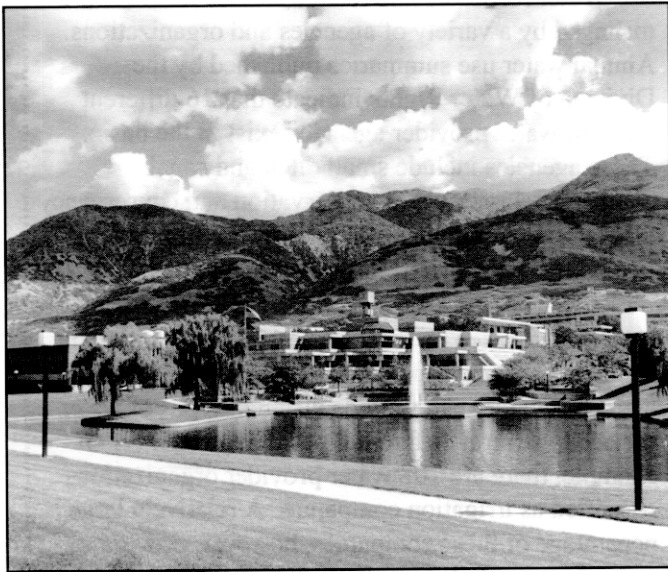
6.3.3 Wholesalers/Multiuse Distributors

Water wholesalers are typically the largest water provider organizations within the basin. They generally have the responsibility to operate and maintain a considerable number of water conveyance, treatment and storage facilities associated with large projects. Water wholesalers provide water for small canal and ditch companies, municipalities, and a number of large industrial and commercial businesses.

Pine View Water Systems - The Pine View Water systems (PVWS) is composed of three entities: The Ogden River Water Users Association, South Ogden Conservation District and the Weber-Box Elder Conservation District. Each of these entities is a corporation with a separate board of directors elected by water share-holders. A general manager is directly responsible to each board for the entire operation of the three organizations. An executive committee, composed of the president of each board and two additional directors, is established each year to coordinate management of the PVWS at the board level between the three organizations.

As the overriding management agency, PVWS is directly responsible for the operation and maintenance of a number of water storage and conveyance systems including Pineview Reservoir, the Ogden-Brigham City Canal, the South Ogden-Highline Canal and a number of pipelines, canals, and related structures associated with South Ogden and Weber-Box Elder Conservation districts. Deliveries from PVWS facilities are primarily used for irrigated agriculture or secondary residential irrigation water.

Weber Basin Water Conservancy District - The Weber Basin Water Conservation District is the operation and maintenance agency for the Weber Basin Project. The project was initially constructed by the Bureau of Reclamation over a 15-year period from the mid-1950s to late 1960s. The Weber Basin Project was designed as a multipurpose project providing flood



Weber State University

towns or cities. Large water conservancy districts and water user associations can also provide water for various M&I uses. Water diverted for municipal-culinary uses can be divided into indoor and outdoor for residential, commercial and industrial uses. Indoor diversions are generally associated with personal uses in private homes, miscellaneous uses in commercial businesses and industrial plants. Outdoor water is

control, hydroelectric power and reliable water supplies for all the basin's needs. The project provides agricultural, municipal and industrial water to Davis, Morgan, Summit, Box Elder and Weber counties

The Weber Basin Water Conservancy District, through agreements with others, operates water storage and distribution facilities including seven major reservoirs, three diversion dams, two main distribution canals, two hydropower generation plants, nine groundwater supply wells, three culinary water treatment plants and over 60 miles of major water conveyance facilities that include various tunnels, aqueducts and canals. Annual diversions from project facilities average around 212,800 acre-feet for irrigated agriculture and various municipal and industrial (M&I) uses. Of the total supply, 162,800 acre-feet are designated for irrigated agriculture with the remaining 50,000 acre-feet for M&I needs. The Weber Basin Project provides culinary and secondary water for nearly all of the basin's populace.

In addition to extensive water treatment and conveyance facilities, the district also operates the Weber Basin Water Quality Laboratory which provides staff and equipment to evaluate and monitor water quality. The laboratory operates in strict accordance to state and federal regulations, and is fully authorized by state and federal water quality regulatory agencies as a water treatment training facility.

Weber-Box Elder Conservation District -The Weber-Box Elder Conservation District was formed to secure water from the Ogden River Project to provide irrigation water to lands lying below the Ogden-Brigham City Canal from Ogden Canyon to Brigham City in Weber and Box Elder counties. The district was formed and purchased its first water from the Ogden River Water Users Association in September 1934.

The district service area generally includes the communities of Ogden, North Ogden, Pleasant View, Plain City, Farr West, Harrisville, Perry, Willard, Brigham City, and unincorporated lands in Weber and Box Elder counties. Water is provided for the irrigation of agricultural crops associated with family farms including fruit orchards, grains, alfalfa, small gardens and residential yards. The conveyance system generally consists of small storage reservoirs with gravity flow systems for secondary water deliveries along the bench areas and onto the valley floor as well as a constant pressure system serving the Plain City and Farr West areas.

The district's annual diversions are taken from storage water rights held in Pineview Reservoir (an estimated 16,000 acre-feet) and water purchased from Weber Basin Water Conservancy District out of the Willard Canal (and estimated 2,100 acre-feet). The district is part of the Pine View Water Systems.

South Ogden Conservation District - The South Ogden Conservation District was organized in 1934, soon after the organization of the Weber-Box Elder Conservation District. The South Ogden-Highline Canal distributes storage water from Pineview Reservoir to eight small storage reservoirs. These storage reservoirs distribute the water to the gravity flow system that serves the residential developments in Ogden, South Ogden, Riverdale and Washington Terrace. The South Ogden-Highline Canal extends from the mouth of Ogden Canyon to Washington Terrace. The original open canal has been completely replaced with reinforced concrete pipe. The district also has two groundwater supply wells in Washington Terrace to provide supplemental water to that area.

Annual diversions from Pineview Reservoir currently average 7,000 acre-feet. The district is part of the Pine View Water Systems.

Bountiful Water Subconservancy District -The Bountiful Water Subconservancy District was initially formed to provide secondary irrigation water to small family farms and residential subdivisions, primarily within the city of Bountiful. The district purchases water from the Weber Basin Water Conservancy District through long-standing water service contracts. Secondary water is distributed via a network of reservoirs, small canals and ditches, pumping plants, gravity flow, and pressurized pipelines. Annual secondary deliveries currently average 13,000 acre-feet, primarily to residential developments.

Roy Water Subconservancy District -The Roy Water Subconservancy District was established in 1969 to provide secondary irrigation water to an estimated 3,500 acres of residential, commercial and agricultural land within the boundaries of Roy City.

The district's primary water supply is diverted from the Davis and Weber Counties Canal Company's main canal near the west entrance to Hill Air Force Base. The diversion terminates at the district's 120 acre-foot equalizing reservoir. Some water is then pumped and distributed as secondary irrigation water to residential and commercial subdivisions within Roy's city limits. The district currently averages an estimated 8,900 acre-

**Table 6-1
COMMON WATER PROVIDER ORGANIZATIONS**

Organization Category	Clientele-Service	Number ^a
Irrigation Companies	Sec-Irrigation Agr-Irrigation	108
Water Companies	M&I-Culinary Sec-Irrigation	62
Ditch Companies	Agr-Irrigation Sec-Irrigation	56
Canal Companies	Agr-Irrigation Sec-Irrigation	21
Reservoir Companies	Sec-Irrigation	4
Pipeline Companies	Sec-Irrigation	3
Irrigation Districts	Agr-Irrigation Sec-Irrigation	1
Water Improvement Districts	M&I-Culinary	4
Water Conservancy Districts	M&I-Culinary Sec-Irrigation Agr-Irrigation	1
Water Subconservancy Districts	M&I-Culinary Sec-Irrigation	2
Water Associations	M&I-Culinary Sec-Irrigation	12
Water User Associations	Agr-Irrigation Sec-Irrigation	6
Water Conservation Districts	Agr-Irrigation Sec-Irrigation	2
Ditches	Agr-Irrigation Sec-Irrigation	36
Pumps	Agr-Irrigation	2
Pipelines	M&I- Culinary Agr-Irrigation Sec-Irrigation	10
Total		330
^a Indicates the total number of a given provider organization according to the latest state accounting. Sec: Secondary irrigation, Agr: Agricultural irrigation, M&I: Municipal and Industrial.		

feet of secondary water deliveries to residential subdivisions and various commercial businesses.

Although the district has historically provided irrigation water for small local farms, the sustained rate of residential growth in recent years has resulted in the near elimination of all farm land in the district's service area. Current water deliveries are almost exclusively to residential homes and local commercial businesses.

Farmington Area Pressurized Irrigation

District - The Farmington Area Pressurized Irrigation District, created by Davis County in 1969, has been delivering pressurized irrigation water service since 1977 to Farmington, south Kaysville, south Fruit Heights and areas of unincorporated Davis County. This district replaced the services of five stock pioneer irrigation companies. The system utilizes the flows of four Wasatch Front Canyon streams supplemented by Weber Basin Water Conservancy District contracts to supply more than 3,300 users with pressurized irrigation for agriculture and M&I purposes.

6.3.4 River Basin Water Users Organizations

Water user organizations are agencies created by groups of canal and ditch companies for the purpose of administering water rights and accounting for diversions on a given river system or reservoir. These diversions are made throughout the water year to individual ditch or canal companies holding water rights or stock in an individual river system or reservoir. Two water user associations are in the Weber River Basin: the Weber River Water Users Association which administers water rights and diversions on the Weber River and within Echo Reservoir and the Ogden River Water Users Association which administers water rights and diversions on the Ogden River and within Pineview Reservoir.

Water user organizations or associations are between canal and ditch companies and water conservancy districts in terms of size of staff and primary responsibilities. Like other water provider agencies, however, water user associations are governed by boards of directors, with personnel to record water storage and diversion data.

Water user organizations, in most cases, are responsible for operating and maintaining dams and reservoirs, main canal systems and accounting for diversions from natural streams and rivers. As a result, water user associations employ various staff to administer, manage, operate and maintain their water service facilities.

Weber River Water Users Association - A number of small canal and ditch companies in Davis and Weber counties were created in the late 1800s. As the area expanded its agricultural base, the demand for irrigation water grew beyond existing supplies provided by direct river or stream diversions. The growing need for seasonal water storage dictated the construction of dams and reservoirs at selected sites on the Weber River drainage.

In 1894 the construction of East Canyon Reservoir was initiated on East Canyon Creek by the Davis and Weber Counties Canal Company, approximately 12 miles upstream of the East Canyon Creek confluence with the Weber River. The first dam constructed provided a total storage capacity of approximately 3,800 acre-feet. After four enlargements, the present reinforced concrete dam currently provides active storage capacity of 48,100 acre-feet. The Davis and Weber Counties Canal Company currently owns the first 28,000 acre-feet of storage, while the Weber Basin Project is entitled to the remaining 20,100 acre-feet.

To meet the increased demand for irrigation water beyond the storage capability of East Canyon Reservoir, the Weber River Water Users Association sought out and received funding through the Bureau of Reclamation to build a new dam at Echo. The resulting dam and reservoir were completed in 1931 and currently provides 74,000 acre-feet of active water storage for stock holders in the Weber River Water Users Association.

Stockholders in the Davis and Weber Counties Canal Company include a number of other small canal and ditch companies throughout Weber and Davis counties.

Ogden River Water Users Association - The Ogden River Water Users Association was organized in 1933 to sponsor the Ogden River Reclamation Project to impound and distribute the surplus waters of the Ogden River to agricultural land in Weber and Box Elder counties. The project was substantially completed in 1937, and water began to flow in the South Ogden Highline and Ogden-Brigham City canals.

Completed project facilities were formally turned over to the Ogden River Water Users Association in August 1937. The association is now responsible for the administration of the project including the operation and maintenance of Pineview Reservoir, a 75-inch steel pipeline in Ogden Canyon, and the South Ogden-Highline and Ogden-Brigham City canals.

The initial Ogden River Project remained unchanged until 1950 when the newly organized Weber Basin Water Conservancy District proposed the enlargement of

Pineview Reservoir. As a result, the Bureau of Reclamation and the Weber Basin Water Conservancy District entered into an agreement to enlarge Pineview Reservoir from its initial storage capacity of 44,175 acre-feet to its current active capacity of approximately 110,200 acre-feet.

Construction on the Pineview Dam enlargement started in 1955 and was completed in 1957. Shortly after its completion, an agreement was negotiated between the Weber Basin Water Conservancy District and the Ogden River Water Users Association stating that the Ogden River Water Users Association would operate and maintain the enlarged facility on a cost-share basis.

The Ogden River Water Users Association currently provides irrigation water for irrigated agriculture and secondary irrigation systems in Weber and Box Elder counties. Deliveries through the Ogden-Brigham City canal average around 18,000 acre-feet annually. Diversions in the South Ogden-Highline Canal average 7,000 acre-feet of annually.

The Ogden River Water Users Association represents and administers water rights through the issuance of stock for two water conservation districts, four municipalities and 17 irrigation companies, all of which are within Weber and Box Elder counties.

6.3.5 Waterfowl

Four large waterfowl management areas are maintained within the boundaries of the Weber River Basin. The Harold S. Crane Waterfowl Management Area is located immediately west of Willard Bay Reservoir and includes nearly 4,000 acres of water surface for migratory waterfowl. Howard Slough is located west of Clearfield with a management area of roughly 2,800 acres in Davis County. The Ogden Bay Waterfowl Management Area is located west of Kaneshville and includes over 9,000 acres of waterfowl habitat. The Farmington Bay Waterfowl Management Area encompasses an estimated 11,400 acres of marshland at the southeastern limits of the Great Salt Lake. The waterfowl management areas are shown on Figure 14-1.

The four waterfowl management areas are operated by the Division of Wildlife Resources which has appropriated water rights to maintain adequate annual flows for wildlife habitat. The Harold S. Crane Waterfowl Management area has appropriated 29,000 acre-feet, primarily from 1st, 2nd and 3rd Salt Creeks near Willard Bay Reservoir. The Ogden Bay Waterfowl Management area is supplied 61,440 acre-feet of water

according to an agreement with the federal government as part of the Weber Basin Completion Act. The Farmington Bay Waterfowl Management area is supplied water from the Jordan River drainage and several small tributaries in the Centerville, Bountiful and Farmington areas. Howard Slough is supplied water from local groundwater irrigation and streams.

6.3.6 Watershed

Nearly all of the major watersheds within the Weber River Basin are mountainous drainages with alluvial bottoms. These watershed areas are generally well managed by a mixture of private individuals and public agencies. Low-lying watershed areas are generally owned by private individuals with most of the mountainous or upper basin watershed areas under public ownership. These public lands are managed by either the Forest Service or Bureau of Land Management.

In general, watersheds in the basin are well managed. Recent investigations, however, by state and local water quality agencies have identified a number of areas in the upper Weber and Ogden River drainages that either have or will potentially have water quality problems if existing land use practices are not changed.

Rapid development in the Huntsville and Snyderville basins is radically changing water use patterns with a degree of negative impact on local water quality. Recent construction associated with oil and gas exploration, in addition to questionable grazing practices, have also created a marked degradation of water quality in Chalk Creek and reaches of the Weber River downstream from their confluence. These issues are discussed in Sections 11 and 12 dealing with drinking water and water quality.

6.4 Problems and Needs

Water managers face a number of problems in the Weber River Basin, primarily in the areas of water quality and groundwater supply. Isolated basins in the upper Weber River drainage have an exceptionally high rate of urban growth. This has resulted in greater diversions from existing water sources and greater domestic effluent discharges to surrounding streams. Increased pumping from groundwater aquifers in the East Shore Area and Snyderville Basin has resulted in substantial declines of groundwater levels at a number of existing well sites in these sub-basins.

The Snyderville Basin and Park City Area has been cited as one of the fastest growing areas of Utah with growth rates between 4 and 5 percent annually. Over 95 percent of all culinary water diversions in the area are

from existing groundwater wells, springs and tunnels. Surface water diversions from either Silver Creek or East Canyon Creek drainages are minimal and usually associated with the irrigation of surrounding livestock pastures or golf courses. As shown in Figure 9-1, the area supports 11 independent water companies, water districts and miscellaneous provider organizations, most of which have private culinary water systems servicing individual residential subdivisions or commercial developments.

Park City Corporation has multiple sources of culinary water including local wells, springs and discharges from surrounding mining tunnels. These sources are treated to culinary standards and distributed to various commercial businesses, ski resorts, municipal facilities and private residential developments within the corporation's service area.

The Summit Water Distribution Company (SWDC) has the largest service area of any water provider agency in the Snyderville Basin. This system provides culinary and irrigation water to the Winter Sports Park Olympic venue site, the Kimball Junction and Rasmussen Road commercial centers, and private residential developments extending along Highway U-224 to the Jeremy Ranch. The SWDC has eight water wells which produce a water supply that appears to be adequate for the near future. But to meet projected demands, SWDC has proposed the construction of a water treatment facility on East Canyon Creek. The proposed water treatment facility will add an additional 2,100 acre-feet of culinary water supply to the basin.

The water rights associated with SWDC's culinary water treatment plant has been approved by the State Engineer. Construction of the treatment plant has been postponed, however, because of a law suit filed by the Snyderville Basin Sewer Improvement District over the reduction of dilution water in East Canyon Creek that may result from the eventual operation of SWDC's culinary water treatment plant.

As Park City, the SWDC and the other independent water companies continue to expand and increase the supply of culinary water, increased demands will be placed on the Snyderville Basin Sewer Improvement District (SBSID) in treating the culinary wastewater effluent. The possible importation of culinary water supply from the Weber Basin Water Conservancy District (Smith and Morehouse Reservoir) or from the Davis and Weber Counties Canal Company (lower East Canyon water) will also impact SBSID's handling of domestic wastewater effluent. Of particular concern to

the SBSID is the decreased flows in East Canyon Creek which have resulted from increased withdrawals of water supplies above SBSID's sewage treatment facility. This reduction in flow also reduces the flow of dilution water for the SBSID's discharge of treated domestic wastewater effluent. This potentially increases the concentration of discharged pollutants from the existing wastewater treatment facility owned and operated by the SBSID. To offset this, the SBSID may be required to add an estimated \$5 to \$10 million in tertiary treatment equipment and facilities in compliance with current federal and state NPDES discharge requirements.

Given the projected increase in the demand for culinary water, natural characteristics of the drainage, and established trends in residential and commercial development, the need for tertiary wastewater treatment seems inevitable. But the overall answer to growth and water development in the Snyderville Basin and Park City Area must be achieved via a comprehensive master plan taking into consideration the various issues mentioned above. The master plan should be pursued as a cooperative effort by the Summit County Planning Commission and all the water-related agencies in the area impacted by growth and the demand for additional culinary water supplies.

Overall pumping rates for culinary water distribution have gradually increased in the East Shore Area and the Snyderville Basin. Depending on the concentration of wells, the degree or severity of groundwater decline varies from location to location within both areas. In areas of concentrated pumpage, groundwater elevations have dropped by as much as 50-80 feet. This has increased power costs and decreased well capacities; in some cases to the point that further operation of existing wells is no longer feasible.

To provide guidelines or policies to better control the continued decline in groundwater levels, the Division of Water Rights (DWRi) is currently in the process of preparing resource management plans for both of the indicated areas. In conjunction with the DWRi's resource management planning efforts, the USGS is in the final stages of a comprehensive water resource study of the Snyderville Basin. Both documents will be subject to a public review process prior to final publication by both agencies.

6.5 Alternatives for Management Improvement

The water demand and quality issues currently impacting overall water development within the Park

City and Snyderville Basin are the concern of all 11 water provider agencies in the area. Although the need for additional culinary water and improvements in water quality vary from agency to agency, significant improvements in these areas can be achieved in a much more efficient and timely manner by one unified agency representing all of the individual water districts in the basin.

The potential for culinary water shortages in the area can be addressed through the development of new water supplies and/or the implementation of various conservation measures. These measures may include 1) reuse of treated wastewater effluent to irrigate golf courses, parks and other large open areas; 2) the implementation of water conservation measures for indoor and outdoor uses; and 3) by converting existing agricultural irrigation water to M&I water. In addition to the stated conservation measures, and as an alternate source of water, up to 6,000 acre-feet of culinary water supplies can be made available from the Weber Basin Water Conservancy District's Smith and Morehouse Reservoir. ♦